Bruhath Bengaluru Mahanagara Palike

QUALITY ASSURANCE/QUALITY CONTROL REPORT

Office of the Chief Engineer (Quality Assurance/Control) Annexure-05,
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QUALITY ASSURANCE REPORT/QUALITY CONTROL REPORT

EE/QA/PR/50 /2022-23, DATE: 21/03/23

Name of Work	:	Package-5 (1) Improvements of Road Adjacent to Yelahanka Lake from Kenchenahalli to Chowdeshwari Temple in Ward No.02 (2) Improvements and Asphalting to New post office main road and cross roads in ward No. 01 (3) Improvements and Asphalting to Sugappa layout cross roads in ward No. 01 (4) Improvements and Asphalting to Shanimahathma swamy temple road and Surabhi layout 2nd main and cross roads in ward No. 01 (5) Asphalting to Balance roads in A & B sector of Yelahanka New Town in Ward No. 04 Estimated cost 465.00 Lakhs
Job Code	:	002-17-000059
Bill No.	:	**3rd &Final Bill, Rs.1,64,25,744.96 (including GST)**
Name of Agency	:	**Sri. R.Lokesh**
Type of Test Performed	:	Rebound Hammer test as per IS13311-(2)-1992.& Bitumen Content and Gradation test as per Table 500.17 MoRTH V Revision.
Materials on which Tests Was Performed	:	1. RCC Drain (M20) 2. Precast cover slab (M20) 3. C.C Road (M20) 4. Bituminous Concrete (Grade II)
Officers present during inspection	:	1.Smt.Tanuja AE – Project Division Yelahanka 2. Sri.Sundresh AEE – Project Division Yelahanka 3. Sri C. Shridhar. AEE-Quality Assurance
Project Management Consultants	:	**Mecadez Core Technologies Private Limited**
Observations	:	➢ NDT (Rebound hammer test) & Bitumen Content and Gradation Test was conducted by Project Management Consultants at random locations in presence of AE(project division, yelahanka zone) and AEE (project division, yelahanka zone) along with AEE of QA division . ➢ The work was inspected from Quality Assurance Division on 30.01.2023 when Asphalting work (DBM Grade II) was under progress at Lake road, yelahanka. Bitumen content & Gradation Test were conducted & test reports submitted by PMC is here by furnished. ➢ The Rebound Hammer Test was conducted randomly on RCC Drain Wall (M20), Precast Cover Slab (M20) & CC road(M20) and also Bitumen content & Gradation Test were conducted for DBM (Grade II) & BC (Grade-II). The readings and results are recorded by the PMC consultants. ➢ The readings of Rebound Hammer Test and Bitumen Content and Gradation Test results are tabulated and analysis of test results done by PMC is here by furnished. ➢ The location wise test results are reproduced in the tables shown below.
Test Locations	:	Location 1: Lake Road Yelahanka (Near Gym Krishna Muninarayana Sanga, near 2nd Main Road, , Near Gym 1st Cross road near junction) Location 2: CC Road-Lake Road ,yelahanka

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Table-01: Bitumen Content and gradation Test Results for Lake Road Yelahanka at random locations

DBM- (GRADE-II)

Landmark/Location	Near Gym Krishna Muninarayana Sanga	Near 2nd Main Road	Near Gym 1st Cross road junction
Description	Trail 1	Trail 2	Trail 3
1.Initial weight of sample (gms) w1	781	778	784
2. Initial weight of filter paper (gms) w2	2	2	2
3. final weight of sample after extraction (gms) w3	746	743	749
4. Final weight of filter paper (gms) w4	3	3	3
5. Weight of finess (gms) w5=(w4-w2)	1	1	1
6. Weight of Bitumen Extracted (gms). w6=w1-w3+w5	36	36	36
7. Bitumen content in % (w6/w1)x100	4.61	4.63	4.59
8. Average	4.61		

SIEVE SIZE mm	Trail 1				Requirement as per MORTH table 500.10
	Weight Retained, gm	Cumulative Weight Retained	Cumulative %Retained	Cumulative % Passing	
37.5	0	0	0.00	100.00	100
26.5	26.49	26.49	3.55	96.45	90 - 100
19	75.84	102.33	13.72	86.28	71 - 95
13.2	102.95	205.28	27.52	72.48	56 - 80
4.75	165.25	370.53	49.67	50.33	38 - 54
2.360	95.25	465.78	62.44	37.56	28 - 42
0.300	145.9	611.68	81.99	18.01	7 - 21
0.075	102	713.68	95.67	4.33	2 - 8

SIEVE SIZE mm	Trail 2				Requirement as per MORTH table 500.10
	Weight Retained, gm	Cumulative Weight Retained	Cumulative %Retained	Cumulative% Passing	
37.5	0	0	0	100	100
26.5	23.5	23.5	3.16	96.84	90 - 100
19	88.3	111.8	15.05	84.95	71 - 95
13.2	102.95	214.75	28.90	71.10	56 - 80
4.75	154.7	369.45	49.72	50.28	38 - 54
2.360	79.5	448.95	60.42	39.58	28 - 42
0.300	168.45	617.4	83.10	16.90	7 - 21
0.075	86.45	703.85	94.73	5.27	2 - 8

SIEVE SIZE mm	Trail 3				Requirement as per MORTH table 500.10
	Weight Retained, gm	Cumulative Weight Retained	Cumulative %Retained	Cumulative% Passing	
37.5	0	0	0.00	100.00	100
26.5	26.5	26.5	3.54	96.46	90 - 100
19	79.2	105.7	14.11	85.89	71 - 95
13.2	115.35	221.05	29.51	70.49	56 - 80
4.75	147.88	368.93	49.26	50.74	38 - 54
2.360	74.6	443.53	59.22	40.78	28 - 42
0.300	165.2	608.73	81.27	18.73	7 - 21
0.075	112.5	721.23	96.29	3.71	2 - 8

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Table-02: Bitumen Content Test Results for Lake Road, Yelahanka at random locations

BC- (GRADE-II)

Landmark/Location	Near Gym Krishna Muninarayana Sanga	Near 2nd Main Road	Near Gym 1st Cross road junction
Description	Trial 1	Trail 2	Trail 3
1.Initial weight of sample (gms) w1	716	715	716
2. Initial weight of filter paper (gms) w2	2	2	2
3. final weight of sample after extraction (gms) w3	677	678	676
4. Final weight of filter paper (gms) w4	3	4	3
5. Weight of finess (gms) w5=(w4-w2)	1	2	1
6. Weight of Bitumen Extracted (gms). w6=w1-w3+w5	40	39	41
7. Bitumen content in % (w6/w1)x100	5.59	5.45	5.73
9.Average	5.59		

SIEVE SIZE mm	Trail 1 Weight Retained, gm	Cumulative Weight Retained	%Cumulative Retained	% Passing	Requirement as per MORTH table 500.17
19.00	0	0	0	100.00	100
13.2	42.37	42.37	6.26	93.74	90-100
9.5	100.37	142.74	21.08	78.92	70-88
4.75	108.7	251.44	37.14	62.86	53-71
2.36	90.45	341.89	50.50	49.50	42-58
1.18	89.47	431.36	63.72	36.28	34-48
0.6	45.25	476.61	70.40	29.60	26-38
0.3	61.84	538.45	79.53	20.47	18-28
0.15	44.26	582.71	86.07	13.93	12-20
0.075	53.20	635.91	93.93	6.07	4-10

SIEVE SIZE mm	Trail 2 Weight Retained, gm	Cumulative Weight Retained	%Cumulative Retained	% Passing	Requirement as per MORTH table 500.17
19.00	0	0	0	100	100
13.2	39.57	39.57	5.84	94.16	90-100
9.5	126.34	165.91	24.47	75.53	70-88
4.75	110.6	276.51	40.78	59.22	53-71
2.36	92.35	368.86	54.40	45.60	42-58
1.18	62.84	431.7	63.67	36.33	34-48
0.6	43.65	475.35	70.11	29.89	26-38
0.3	52.25	527.6	77.82	22.18	18-28
0.15	48.65	576.25	84.99	15.01	12-20
0.075	66.5	642.75	94.80	5.20	4-10

SIEVE SIZE mm	Trail 3 Weight Retained, gm	Cumulative Weight Retained	%Cumulative Retained	% Passing	Requirement as per MORTH table 500.17
19.00	0.00	0.00	0.00	100.00	100
13.2	39.47	39.47	5.84	94.16	90-100
9.5	95.67	135.14	19.99	80.01	70-88
4.75	99.64	234.78	34.73	65.27	53-71
2.36	125.37	360.15	53.28	46.72	42-58
1.18	71.24	431.39	63.82	36.18	34-48
0.6	42.15	473.54	70.05	29.95	26-38
0.3	72.54	546.08	80.78	19.22	18-28
0.15	25.15	571.23	84.50	15.50	12-20
0.075	64.80	636.03	94.09	5.91	4-10

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Table-03: Rebound Hammer Test Results for Location-2

Sl. No.	Member	Rebound Hammer Number	Average reading	Compressive Strength (N/mm2) for 28 days	Impact Direction
Sample Tested Location at CC road - Lake Road, yelahanka					
1	RCC Drain (M20)	30	30	24	Horizontal
2		30			
3		32			
4		28			
5		28			
6		30			
1	Precast Cover Slab (M20)	28	28	22	Vertical down
2		28			
3		28			
4		24			
5		30			
6		30			
1	CC Road(M20)	28	28	22	Vertical down
2		26			
3		28			
4		30			
5		28			
6		28			

Table-04: Bitumen Content and gradation Test Results for Lake Road Yelahanka (inspected on 30-1-2023)

DBM- (GRADE-II)

Description	Trail 1
1.Initial weight of sample (gms) w1	500.60
2. Initial weight of filter paper (gms) w2	2
3. final weight of sample after extraction (gms) w3	479.00
4. Final weight of filter paper (gms) w4	3
5. Weight of finess (gms) w5=(w4-w2)	1
6. Weight of Bitumen Extracted (gms). w6=w1-w3+w5	22.60
7. Bitumen content in % (w6/w1)x100	4.51

SIEVE SIZE mm	Trail 1				Requirement as per MORTH table 500.10
	Weight Retained, gm	Cumulative Weight Retained	Cumulative %Retained	Cumulative % Passing	
37.5	0.00	0.00	0.00	100	100
26.5	25.36	25.36	3.16	96.84	90 - 100
19	88.30	113.66	15.05	84.95	71 - 95
13.2	70.25	183.91	28.90	71.10	56 - 80
4.75	102.50	286.41	49.72	50.28	38 - 54
2.360	45.24	331.65	60.42	39.58	28 - 42
0.300	65.21	396.86	83.10	16.90	7 - 21
0.075	53.60	450.46	94.73	5.27	2 - 8

24/03/2023

ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಮಟ್ಟ/ಗುಣನಿಯಂತ್ರಣ ಉಪ-ವಿಭಾಗ ಯಲಹಂಕ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಮಟ್ಟ/ಗುಣನಿಯಂತ್ರಣ ವಿಭಾಗ ಯಲಹಂಕ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

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Conclusion:

The file containing 3rd & final bill has been submitted for the above work to QA department on 09.03.2023 requesting for spot inspection. Engineers of QA/QC division have visited the work spot on

During the inspection, engineer in charge of work informed that items found in the bill, have been executed by the contractor & documents were made available by PMC team for inspection.

PMC team was instructed to assess the strength of concrete used for RCC Drain Wall (M20), Precast cover slab (M20) & CC Road(M20) and also Gradation & Bitumen content for DBM (grade-II) and B C (Grade-II) on Asphalted road. The Rebound hammer test and Bitumen Content and Gradation Tests were conducted by PMC in presence of engineer in charge of work.

From the test results furnished by PMC consultants, it is concluded that the results of the samples collected are in accordance with the standards/ specifications mention in the IRC codes. However, the results submitted by the PMC have been reproduced here with for further needful action. The results checked by QA/QC relates only for item tested in the particular location randomly.

Further, QA/QC directs the PMC and Engineer in-charge of the work that all materials used for the work shall be inspected, tested and accepted as per the relevant specifications before incorporation in the work. The frequencies and methods of sampling and testing materials, including those required for definite purpose and not covered by MORT&H specifications shall be in accordance to the relevant IRC or BIS or AASHTO/ASTM/BS standards in order of priority.

This work was inspected on 30.01.2023 as per the request of engineer in charge of work when Asphalting work (DBM Grade II) was under progress at lake road , Yelahanka new town. Further work progress / request for inspection was not intimated to QA division apart from the above-mentioned dates & now presently the bill submitted for the work. Therefore, randomly NDT (Rebound Hammer Tests) and Bitumen Content and Gradation Tests were conducted as explained in this report.

Engineer in charge of work shall ensure that Observations raised during inspection from QA division shall be complied (vide PR No CE/QA/PR/190/22-23 dated 15.02.2023) certified by competent authority of respective zone and necessary action to be taken accordingly & also to adopt observations/instructions for the work

The concerned Engineer in charge of the work shall follow the direction issued by Chief Commissioner Letter number dated 01.08.2022 and 14.09.2022 and take necessary action as appropriate in accordance with the law.

Note: -

This report by QA/QC is pertaining to the work carried out in 3rd & final bill only.

Engineer in charge of work shall display details of work, work code, cost of project, start and completion date, and information of Engineer in charge of work with contact numbers at work spot.

Engineer in charge of work and Agency shall ensure that if any damages or defects occur pertaining to the executed work within the Defect Liability period (DLP) as per agreement .The same shall be rectified immediately on top priority without fail.

21/3/2023

ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ಉಪ-ವಿಭಾಗ ಯಲಹಂಕ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

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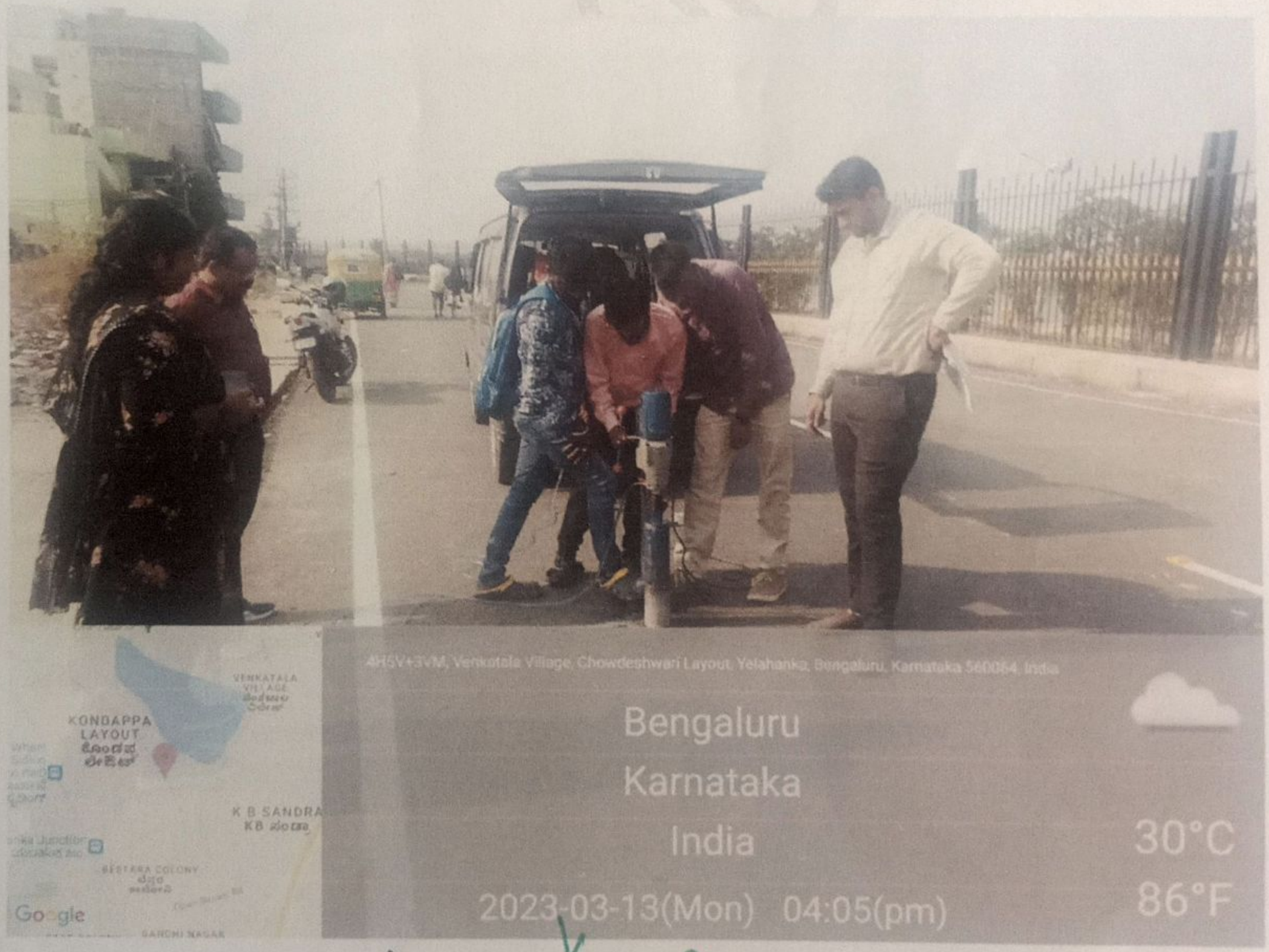
Location 1:

Location 2:



21/3/23

ಗುಣಮಟ್ಟದ/ಗುಣನಿಯಂತ್ರಣ ಉಪ-ವಿಭಾಗ ಯೆಲಹಂಕ
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Location 3 :

Location 4 :

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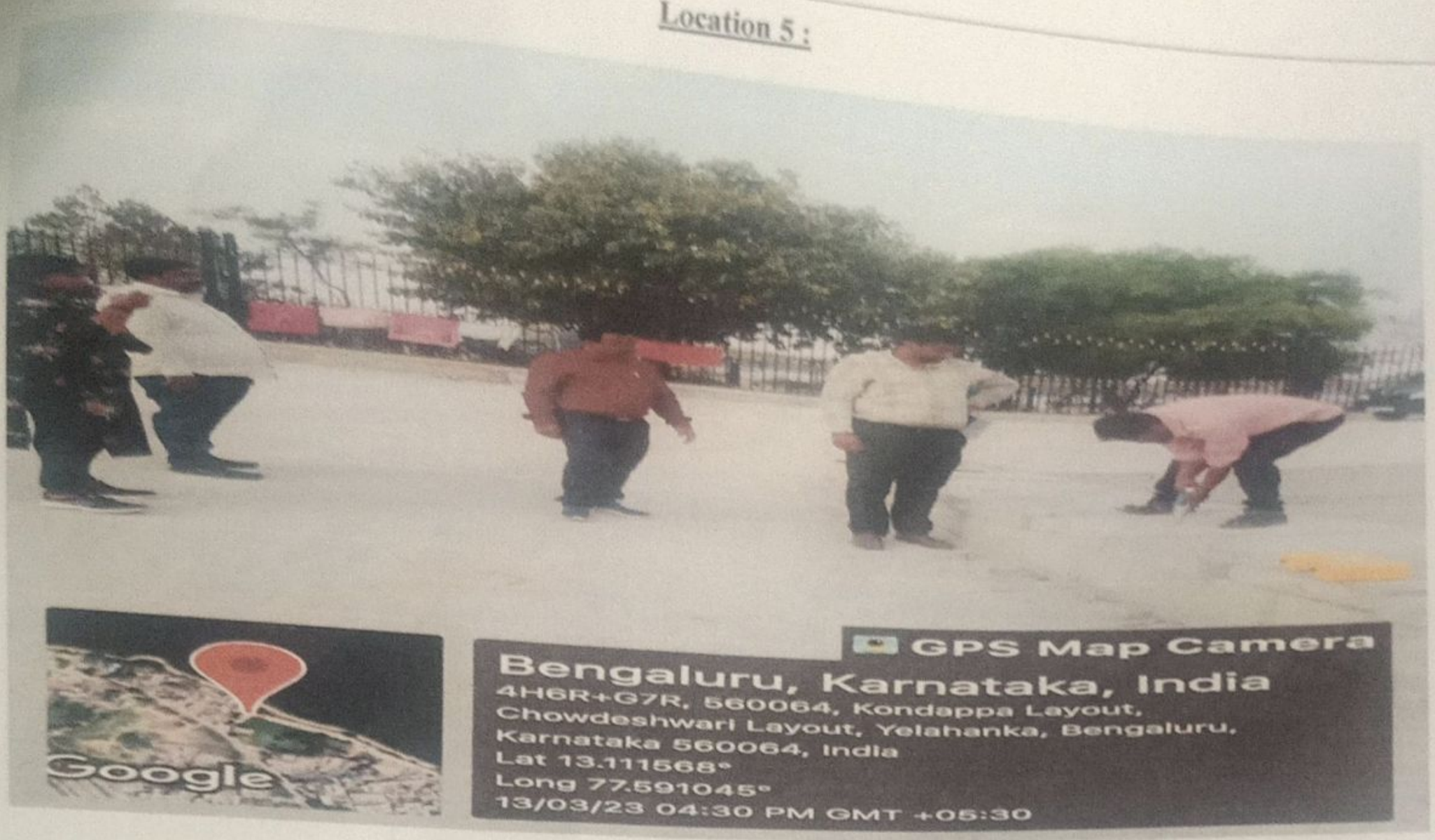
Location 5 :



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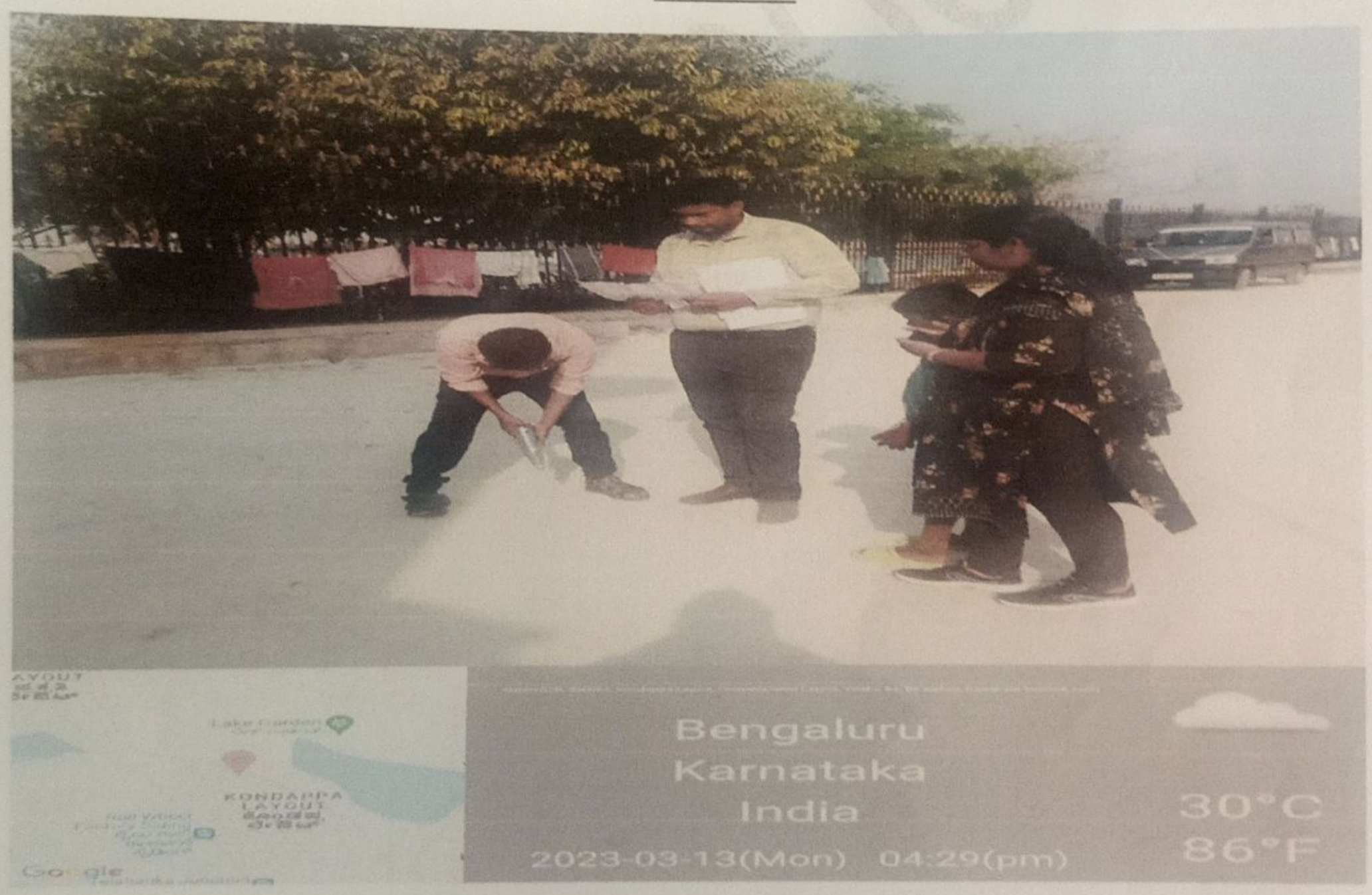

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ಗುಣಮಟ್ಟ/ಗುಣನಿಯಂತ್ರಣ ವಿಭಾಗ
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21/3/23

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
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